SYMONS'S

MONTHLY

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## THE EURYDICE SQUALL.

*To the Editor of the Meteorological Magazine.*

SIR,—The disaster of the 24th March, 1878, will not soon be forgotten, for its memory lives in many aching hearts, but the Meteorological conditions which occasioned it are likely soon to pass out of mind unless examined and recorded with some care. I propose, in this letter, first, to describe shortly the more general weather conditions of the day; secondly, to investigate from the data at present in my hands, the course, extent, and velocity of the squall in which the Eurydice capsized; and, thirdly, to make some observations on those particulars in which the squall was of a remarkable or instructive character.

The 8 a.m. reports of the Meteorological Office showed a large shallow depression east of the Gulf of Bothnia; in Scandinavia pressure was very uniform; moderately steep gradients for N.W. winds (·017in., per 15 nautical miles, from Valentia to Shields) existed across the British Isles. The isobars and currents were somewhat wavy, a shallow secondary, with rain, lying over the N.W. of France, and another very slight one, with snow showers and very low temperature, over the north of Scotland.

The 6 p.m. reports show a moderate increase of pressure to have taken place over the northern part of the North Sea. The lower isobars then bulged westward over the extreme north of England, forming a secondary depression over that district. A more important secondary then lay over the South-east of our islands. Its centre was at that hour close to Yarmouth; bar 29·39; but the 29·50 isobar lying N.W. to S.E. from Liverpool to London trends from the latter southwards to Paris, and thence to N.E. through Belgium. The gradient between Valentia and Liverpool had risen to ·024 in., and a moderate N. gale was blowing in the Irish Channel. No distinct trace of the squall is shewn in these reports, for the disturbance had passed over England between the hours at which the observations were taken.

Very fine weather prevailed at 8 a.m. over nearly the whole of England. At many localities in Scotland and Ireland snow showers were then falling, but I am unable, from reports hitherto received, to

identify the Eurydice snow-squall either north of the Border or on the west of the Irish Channel.* It does not appear to have been noticed at Dumfries or even at Holyhead. This letter may lead observers in the N. and W., who may be willing to do so, to communicate data from which the earlier stages—and, possibly, the first formation of the squall—may be traced. At present I incline to the belief that it originated over the Northumberland and Cumberland hills. The earliest notices of the squall yet received are North Shields 9.35, and Stonyhurst and Liverpool 10 a.m.

The accompanying table gives the times at which the snow-storm commenced and terminated at the different stations from which I have received reports of its passage. I have appended a ? to the name of the station in the cases in which the identity of the squall is doubtful, and to the time when not assured of the exactness of the latter. An * signifies that the report was communicated through the Editor; † that it was obtained from, or by the permission of, the Meteorological Office; and ‡ that it was derived from a newspaper cutting. The direction of the wind, when reported, immediately before, and during, the squall is also given in the table, with a few remarks mentioning, when known, the time of greatest wind-force.

As regards the appearance of the storm-cloud, both in its approach and as viewed from the rear, the few observations which I have received are scarcely minute enough to convey a very distinct impression, for the cloud-observer is a *rara avis in terris*. The front edge as seen from Worcester striking the Malvern Hills is succinctly described by one spectator as "resembling a white wall." Another, who viewed it from Headley Common, in Surrey, calls it "an enormous black cloud like a monster balloon." Others speak simply of "gathering clouds." Mr. Glyde, one of the best cloud-observers in England, informs us that at Torquay "large cumuli, topped with cirri, began to show themselves in N.N.W., and gradually spread over" the sky, the snow and squall commencing 30 minutes after this appearance. This was as nearly as possible what I noticed in Leicestershire. White fragmentary cumuli, under a very clear blue sky, had prevailed during the morning. The storm first showed itself in distant N.W. (stretching from W.S.W. to N.N.E.) as a bank of dense white cirro-stratus, with bold cumuli running up into its under surface. I predicted thunder and a squall (the first of which did not occur, while the second exceeded my expectations), about forty minutes before the storm came over, and I believe most weather-watchers who chanced to be on the look-out would have made a similar forecast, *at least in this part of the country*. The lines of cirrus gradually spread to the zenith, moving rather slowly from due N.W., their front edge being, as I reckoned it, about 20 miles in advance of the falling snow. As the

* Since the above was sent to press I have received from the Meteorological Office the intelligence that "in the West of Limerick the change occurred about 11.30."

snow ceased, 70 minutes after it had begun, the nimbus cleared with a straight edge in W. by N. At 4 p.m. this edge could only be seen 20° above the horizon in E. by S., and this edge, composed of high cirriform cloud, moved at that hour, to my surprise, rapidly from S.S.W. over a N.N.W. under-current. Thus the position of the cloud-bank as seen approaching and retiring suggested the idea that the snow-storm was of greater width on the eastern than on the western side of this station.

This seems borne out by the greater duration of the snow-fall on the east coast of England than on the west, for in Northumberland the duration was 1 hour 55 minutes, and at Grimsby 4 hours, whereas at Hereford it is reported as 20 minutes, and at Ross and Malvern 45 minutes.

In its progress south-eastward this peculiarity of contour seems to have been maintained, for at Camden Town you report it as lasting about 90 minutes, and Mr. Mawley gives the same duration for Addiscombe, whereas at Hurst Castle the duration was 45 minutes, and at Torquay 40 minutes.

It appears, however, that the eastern portion of the snow-storm travelled with considerably less velocity than the part which passed over the Midland counties. This fact is graphically shown in the two accompanying charts.

A change of an important kind also occurred in the snow-storm during its transit. In the north of England, and as far as the Midlands, the snow began some time before the severer part of the squall. Thus, at Stonyhurst, the wind rose to 14 miles an hour at 10 a.m., and reached 30 miles an hour at 11 a.m.; whereas in the Metropolis, and in the south of England generally, strong gusts occurred with or even before the falling snow. In Leicestershire the wind rose slightly with the fall of the first snow-flakes, but the actual squall, which I should estimate at force 7, did not occur till 15 minutes later, and scarcely lasted 12 minutes. It is also noticeable that in the north the wind continued to blow rather strongly at and after the end of the snow-storm, *e.g.*, at Stonyhurst it blew 20 miles per hour one hour after the sky had cleared; but in the south the wind, at the conclusion of the snow-storm, subsided very quickly. This is clearly shown in the Beckley's anemograph at Addiscombe, and Mr. Mawley remarks that "at the same moment that it ceased snowing the wind dropped even more suddenly than it had risen an hour and a half before."

As regards the direction of the wind on the earth's surface, at most, if not all, of the inland stations the N.W. wind which had prevailed at the earlier hours backed to a point south of W. before the storm commenced, and veered suddenly northward (at most places to N.N.W., and at a few temporarily to N.N.E.) during the squall. At North Shields, which lay somewhat near the centre of the small secondary at 9.30 a.m., the change of wind was from W.N.W. to N.N.E. The change at Scarborough was also from W.N.W. to N. At Yarmouth, which experienced the centre of the small depression at

6 p.m., the wind changed at that hour from S.E. to N.W. Snow is reported at this station to have fallen from "daylight to dark." But at none of these stations on the east coast does the wind seem to have blown with much force, and nothing remarkable beyond the sudden veering seems to have been observed.

At some places in the south-eastern districts the wind is reported in the newspapers, probably somewhat hyperbolically, as blowing "from all quarters."

Estimating the velocity with which the snow-storm progressed from the time when the snow began to fall at Stonyhurst and at Hurst Point lighthouse, we find this velocity to be 40 miles per hour. If, however, we reckon it from the time of the greatest force of what may be called the actual squall we get the velocity of 48½ miles. It is perhaps scarcely needful to state that neither of these velocities necessarily represents the velocity of the movement of the air, or the wind occurring in the squall.

For the horological accuracy of the table I am not responsible, but assuming this to be in the main satisfactory, I have constructed from the table the two accompanying maps, showing approximately the areas covered by the snow-storm at 10 a.m. and 3 p.m. respectively, with the general directions of the surface-winds and upper-currents, the former shown by solid, and the latter by dotted arrows.

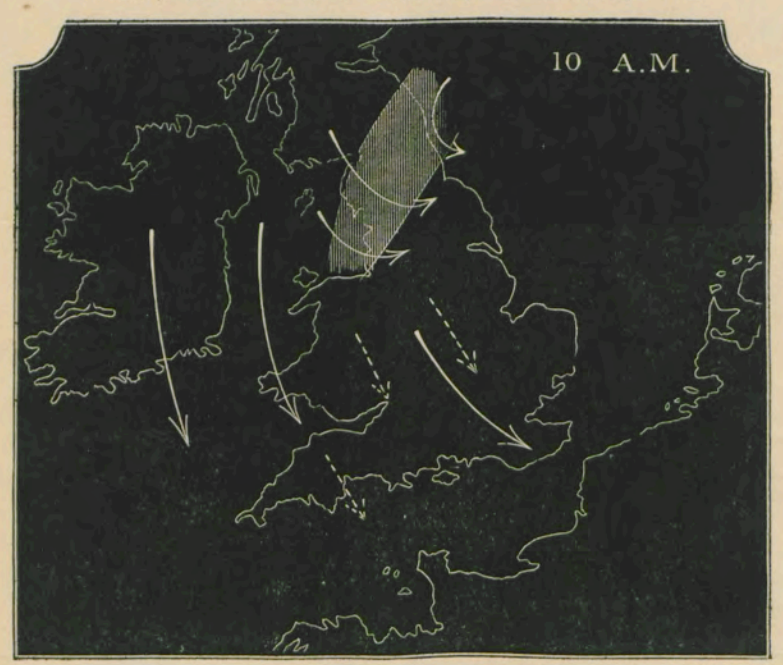
Thus advanced, as if bent on its tragic mission, this remarkable storm-cloud. About 9 a.m. it left the Northumberland hills covered with deep snow. Seven hours later it sent its icy blasts down the chines of the Isle of Wight upon the hapless *Eurydice*, just returning, like her fabled namesake, to loving greetings,—"*jam luce sub ipsâ.*"

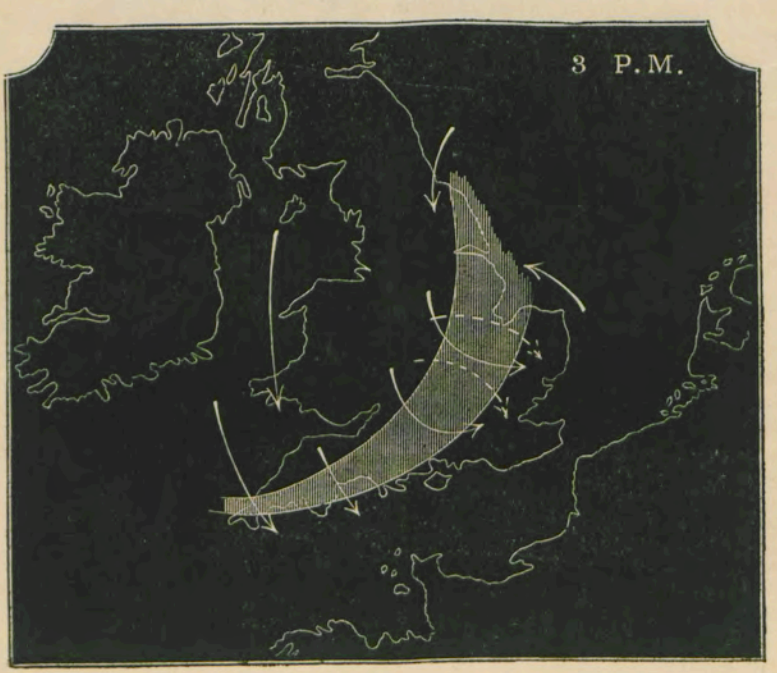
Shortly before 5 p.m. the snow-storm reached Crowborough Beacon. It swept over Brighton as "a hurricane of wind and blinding snow," and left our shores. The snow was falling at Cape Griznez at 6. What modifications the squall may have undergone in crossing the Channel, or whether it was actually felt on the French coast as a squall at all, I have not at present the means of determining. Mr. Vibert reports a squall, with soft hail, at St. Aubyn's, Jersey, at 5 p.m., and the succeeding night was squally there.

As already mentioned, this squall is not reported as having occurred at Holyhead, where "there was nothing exceptional in the weather," but "the wind blew a fresh gale, with snow squalls throughout the day, nothing that would call for remark, and not a heavy gale at any time." It seems also not to have occurred, or to have been so slight as to escape notice, at some of the Welsh stations. Mr. Walker mentions, however, an extensive hail-shower, "decidedly a squall," at St. Ann's Head, at 0·30 p.m.

It is necessary to mention the subsidiary squalls which occurred during the day, especially between 4 and 6 p.m., in the N. and W. of the British Isles. A heavy thunder and snowstorm passed over Liverpool at 5 p.m. Lightning was seen at Stonyhurst, and also in the West Riding, about 8 p.m., and at that hour thunder and lightning

WIND, WEATHER, & CIRRUS, MARCH 24TH, 1878.



## DETAILS OF PASSAGE OF EURYDICE SQUALL, MARCH 24TH, 1878.

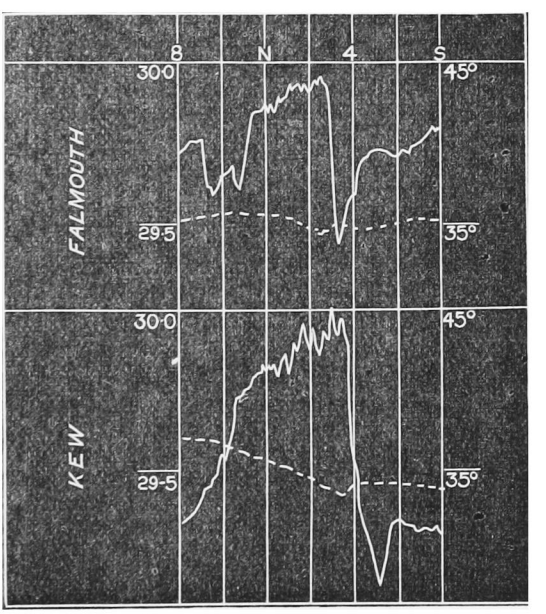
| COUNTY. | STATION. | Snowstorm began. | Snowstorm ended. | Wind before Snowstorm. | Wind in Snowstorm. | REMARKS. | AUTHORITY. |
|---|---|---|---|---|---|---|---|
| Northumberld. | North Shields | 9.35 | 11.30 | WNW | NNE | Gentle to fresh breeze. | A. S. Nicholson. † |
| Westmoreland. | Copy Hill, Shap | 11? | ... | ... | ... | | W. Hoggarth * |
| York | Aysgarth, Bedale | 10.20 | ... | SW | NW | Nimbus first in W., 10 a.m. | F. W. Stow, F.M.S. †*‡ |
| ,, | Arncliffe | 10.15 | 0.0 | ... | ... | Heavy snowfall. | W. Boyd. * |
| ,, | Grassington Mines | 10.15 | 1.30 | ... | NW | Hurricane at 11 a.m. | S. Eddy. |
| ,, | Skipton | 11? | ... | W | ... | Gentle snow before squall. | ,, |
| Lancashire | Brindle, Chorley | 10.25? | ... | ... | ... | | ,, |
| ,, | Stonyhurst | 10 | 0.0 | SWbS | NW | Velocity 30 miles, at 11 a.m. | S. J. Perry, F.R.S. |
| ,, | Liverpool | 10 | ... | ... | ... | Severe snowstorm. | * |
| ,, | Manchester | 10.40? | ... | ... | ... | Snowstorm before noon. | ‡ |
| Lincoln | Killingholme, Grimsby | 1.30 | 5.30 | ... | ... | Continuous snow. | J. Byron, F.M.S. * |
| Shropshire | Shrewsbury | 0.0? | ... | ... | ... | Violent at noon. | E. V. Pigott, F.M.S. * |
| ,, | Ludlow | 11.55? | ... | ... | ... | From N. towards S.E. | ‡ |
| Stafford | Stafford | 0.0 | ... | ... | ... | Snowstorm. | |
| Leicester | Melton Mowbray | 1.30 | ... | ... | ... | Snow with squalls. | A. M. Rendell. * |
| ,, | Lutterworth | 1.50 | 3 | WSW | NNW | Hardest at 2.5 p.m. | W. C. Ley, F.M.S. |
| Hereford | Hereford | 1 | 1.20? | ... | NW | Hailstorm, strong squalls. | E. J. Isbell. |
| ,, | King's Capel, Ross | 1? | 1.20? | ... | NW | Squall, hail and snow. | A. Ley. |
| ,, | Ross | 1 | 1.45 | WNW | N | Violent for short time. | H. Southall, F.M.S. |
| Worcester | Tedstone de la Mere | 0.40? | 1.30 | ... | NNW | Violent. | F. S. Lea. ‡ |
| ,, | Malvern | 1 | 1.45 | ... | NW | Travelled 35 miles per hour. | ‡ |
| Northampton. | Northampton | 2 | 3 | ... | ... | Heavy. | H. Terry. * |
| Cambridge | Cambridge | 3.15? | ... | ... | ... | Heavy squall 3.30 p.m. | G. Warren. * |
| Norfolk | Diss | 4.10 | ... | W? | W? | Very short squall from W. | T. E. Amyott. |
| Pembroke | St. Ann's Head ? | 12.25? | ... | N | N | Hail squall. | J. C. Walker. † |
| Gloucester | Cheltenham | 2 | ... | ... | ... | Terrific, but short. | R. Tyrer, F.M.S. * |
| Berks | Newbury | 2.30 | 3.30 | NW | N | Hurricane for short time. | J. Ward. * |
| ,, | Windsor | 3.5? | ... | ... | ... | Snowstorm, and violent gusts. | ‡ |
| Oxford | Oxford | 2.15 | 3 | ... | ... | | ‡ |
| Middlesex. | Camden Town | 3.45 | 5.10 | ... | ... | Gusts before snow. | G. J. Symons, F.M.S. * |
| Surrey | Kew | 3.50 | ... | W | NW | Complicated currents. | †* |
| ,, | Addiscombe | 4.5 | 5.30 | W by S | NW | 26 miles between 4 and 5.15. | E. Mawley, F.M.S. |
| ,, | Dorking | 4.15? | ... | ... | ... | Tornado, followed by snow. | ‡ |
| Kent | Greenwich | 3.55 | ... | WSW | NNW | | Sir G. B. Airy, F.R.S. ‡ |
| ,, | Tunbridge Wells | 4.50? | ... | ... | NW | Sudden, violent and short. | C. L. Prince, F.M.S. |
| Cornwall | Falmouth | 2.45 | ... | ... | ... | | † |
| Devon | Torrington | 2? | ... | ... | ... | Slight fall of snow. | E. Baseley. * |
| ,, | Tavistock ? | 4? | ... | ... | ... | Wind and snow at 4 p.m. | W. Merrifield. * |
| ,, | Teignmouth | 3? | ... | ... | ... | Squall of wind. | G.W. Ormerod, F.M.S.* |
| ,, | Torquay | 2.45 | 3.25 | NW | NNW | Squall (force 6) for 10 min. | E. E. Glyde, F.M.S. |
| Somerset | Porlock | 1.30 | 2 | ... | ... | Hurricane, sleet and rain. | * |
| Wilts | Compton Basset, Calne? | 4.30? | ... | ... | ... | | J. Allen. * |
| ,, | Salisbury | 3 | ... | ... | NNW | Wind very high. | *‡ |
| Hants | Southampton | 3 | 4 | ... | ... | Heavy sleet and snow. | ‡ |
| ,, | Hurst Lighthouse | 3.15 | 4 | ... | NNW | Terrific for 15 or 20 min. | T. Lanceley. † |
| Isle of Wight. | Ventnor | 3.40 | ... | ... | NNW | Sudden snow squall. | ‡ |
| Isle of Jersey. | St. Aubin's | 5 | ... | ... | N | Short squalls, soft hail. | J. E. Vibert, M.C.P. |

occurred at Llandudno. At an earlier hour snow-showers are reported from S. Wales, Monmouth and Herefordshire. At Valentia a tremendous hail-squall occurred at 8 p.m., and one at Pembroke, force 9, at 1.30 a.m. of the 25th.

As regards the conduct of the barometers in the Eurydice squall, I have but few data, but these are of great interest. At Stonyhurst, the general decline, which took place until 5 p.m., was interrupted at the time when the squall reached its climax; pressure rising ·028 between 11 a.m. and noon. At Babbacombe, Torquay, a somewhat similar rise occurred, ·009 in ten minutes. At Falmouth, a well-marked jump, preceded by minor oscillations, is shown in the barogram at 2.45 p.m. Finally, at Kew the barogram shows a rather larger and smoother rise of pressure at the time of the passage of the squall.

The thermometers at all the places traversed, from which I have records, fell with extreme rapidity during the squall. At Bedale the fall amounted to 13°·7; at Stonyhurst to 7°·4; at Falmouth to 10°; at Torquay to 10°·9; and at Kew to 13°·9; but the the fall at the last-mentioned station was more gradual. At the Royal Observatory, Greenwich, the fall also amounted to about 13°.

The diagram shows the barometric and thermometric oscillations at Falmouth and Kew, obtained from the Meteorological Office.




Mr. Cullum informs me that at Valentia Observatory the photograms showed "decided jumps" of the mercury "at the time of the squalls," which occurred frequently throughout the day, and that

these jumps "coincided with the dips in the thermogram, caused by the fall of hail."

How far the Eurydice squall was of an exceptional character it is difficult to decide, for the simple reason that we, at present, know very little either of the causes or of the morphology of squalls in general. I speak of *squalls* as distinguished from ordinary *storms* on the one hand, and from the very local *gusts* common in thunder-storms on the other. I have observed that squalls, in this restricted sense, commonly originate, in our latitudes, somewhat on the rear, but almost always on the right-hand half, of a cyclonic circulation. In this respect they resemble our ordinary secondary depressions, and with the latter they appear to be sometimes united, although the majority of our secondaries are not attended by squalls. The few squalls that I have attempted to examine have had much their longest diameter nearly at right angles to the direction of the wind, or of the isobars. In these respects the squall of March 24th may perhaps be regarded as typical. I believe, however, though I can scarcely prove, that the longest diameter of this squall exceeded the shortest, at least in the South of England, to an unusual degree. In one other respect it was decidedly exceptional, viz., in the backing of the cirrus current about 112° during its passage. Its influence upon the upper-current was in fact much the same as that which is produced by the transit of a large cyclone, and vastly in excess of that which usually occurs in the passage of small secondary depressions. This seems to indicate that this squall was of extraordinary altitude, the vertical movements of the atmosphere which attended it being unusually extensive.

It seems clear that the disturbance was associated with, and at its eastern extremity attached to, the secondary depression which passed south-eastward down our east coast; and it may be worthy of note that the subsidiary squalls, which occurred at a later hour in the west, stood nearly in the same relation to the other but less important secondary noticed at 6 p.m., over the north of England.

I have trespassed already so much on your space, that I must only suggest for the consideration of your readers two—perhaps they are really one—of the numerous theoretical questions that occur to me. Whence comes it that in a squall like this the velocity of the wind is much in excess of that corresponding to the barometric gradient at the time of the squall's passage, whereas before and after the squall, the velocity is low in relation to the gradient? And how is it that the wind-curves around and in the squall are what we should expect if the barometers were lower beneath the squall-cloud than on the outside of it, whereas they are actually higher?

One practical remark. It is obvious (apart from the fact that storm-warnings would not have saved the *Eurydice*), that the data received by the Meteorological Office could have furnished no forecast of this squall, and that that office would not from those data have been justified in sending storm-warnings to our South Coast. Whether far more frequent telegrams from a far larger number of observers, and at

a much larger Governmental outlay, may one day furnish the means of foretelling the course of a squall successfully, is a question on which I shall not enter. At present I know of but one practical lesson to be learned from the disaster of March 24th, which is this: Let meteorology, and, not least of all, the principles of cloud observation, occupy a very large place in the education of seamen.

With gratitude to the observers who have contributed the materials for this sketch, and last, but not least, to the Editor of the *Meteorological Magazine*.—I remain, yours truly,

W. CLEMENT LEY.

*Ashby Parva, Lutterworth, April 10th*, 1878.

[We were favoured by several correspondents with notes upon this squall, but hearing that Mr. Ley was willing to investigate the subject, we placed all the materials in his hands, and are sure that both the writers of the letters, and our readers, will agree with us in thinking that the arrangement has been in every respect most advantageous. —*Ed.*]

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## CANADA METEOROLOGICAL OFFICE REPORT.

*To the Editor of the Meteorological Magazine.*

SIR,—In your review of the Sixth Annual Report of the Meteorological Service for the Dominion of Canada, you quote the following:—"In many cases systematic errors have been committed, which were detected on the station being inspected, and their occurrence prevented for the future, but which have in several instances made the past observations entirely useless, and in others seriously impaired their value," and add, "we cannot understand anyone printing such a statement as this, and not saying *which* past observations are entirely useless."

It might, perhaps, have been better to have added in the Report that the observations referred to have, in consequence, not been published.

The omission was owing to the fact that the sole object of the sentence was to urge upon the Minister the necessity of providing means for more frequent inspection.

I trust that you will be good enough to insert this explanation in your Magazine.

I am, Sir, your obedient servant,

CHARLES CARPMAEL,
*Deputy Superintendent.*

*Meteorological Office,*
*Toronto, Canada.*

[We insert the above letter with great pleasure, as we always regret giving currency to a wrong impression; but are sorry that Mr. Carpmael did not make his letter longer, for we are still far from sure that we comprehend the exact *status quo*. Certain stations have been

started, and subsequently, on inspection, errors have been detected which have vitiated the observations made prior to the inspection. We now learn that, for that reason, the records from those stations have not been published. Hence, we suppose, the fact is that these stations were all new ones, of which no records have ever been printed. We are very sorry that the Canadian office should find such difficulty in obtaining funds for the very necessary duty of inspection, as is implied in the last sentence but one of Mr. Carpmael's letter. When will people learn to estimate meteorological work by quality instead of quantity, and to treat able meteorologists as benefactors instead of beggars?—*Ed.*]

## SUPPLEMENTARY TABLE OF RAINFALL IN MARCH, 1878.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see Met. Mag., Vol. XI., p. 28., but the list is under revision.]

| Div. | Station. | Total Rain. | Div. | Station. | Total Rain. |
|---|---|---|---|---|---|
| | | in. | | | in. |
| II. | Acol | 1·87 | XI. | Solva | 1·67 |
| ,, | Littlehampton | 1·59 | ,, | Castle Malgwyn | 1·83 |
| ,, | Hailsham | 1·22 | ,, | Nantgwilt, Rhayader | 3·41 |
| ,, | St. Lawrence, I. of W. | 2·26 | ,, | Carno | 3·68 |
| ,, | Strathfield Turgiss | 1·10 | ,, | Rhug, Corwen | 2·82 |
| III. | Addington Manor | 1·06 | ,, | Port Madoc | 3·19 |
| ,, | Oxford | ·85 | XII. | Carsphairn | 2·30 |
| ,, | Northampton | ·63 | ,, | Melrose | 1·00 |
| ,, | Cambridge | ·95 | XV. | Gruinart | 2·26 |
| IV. | Sheering | ·97 | XVI. | Grandtully | ... |
| ,, | Diss | 1·89 | XVII. | Tomintoul | 2·62 |
| ,, | Swaffham | ·84 | ,, | Keith | 1·93 |
| V. | Alderbury, Salisbury | 1·31 | XVIII. | Dalwhinnie | 6·85 |
| ,, | Compton Bassett | 1·83 | ,, | Auchnasheen | 9·50 |
| ,, | Dartmoor | 4·17 | ,, | Springfield, Tain | ... |
| ,, | Teignmouth | 1·81 | ,, | Glenfinnan | 11·21 |
| ,, | Langtree, Torrington | 2·74 | XIX. | Watten | 2·82 |
| ,, | Cosgarne, St. Austell | 2·36 | XX. | Glenville, Fermoy | 1·25 |
| ,, | Taunton | 1·50 | ,, | Tralee | 1·80 |
| VI. | Bristol | 2·19 | ,, | Tipperary | ... |
| ,, | Sansaw | 1·35 | ,, | Newcastle W., Limerick | 1·40 |
| ,, | Cheadle | 1·20 | ,, | Kilrush | 1·21 |
| ,, | Bickenhill Vicarage | 1·16 | XXI. | Kilkenny | ·77 |
| VII. | Coston, Melton Mowbray | ·60 | ,, | Kilsallaghan | 1·57 |
| ,, | Bucknall | 1·12 | ,, | Twyford, Athlone | 1·92 |
| VIII. | Walton, Liverpool | 1·49 | ,, | Belvedere, Mullingar | ... |
| ,, | Broughton-in-Furness | 2·75 | XXII. | Ballinasloe | 1·60 |
| IX. | Stanley, Wakefield | ·62 | ,, | Kylemore | 4·68 |
| ,, | Mickley, Ripon | ·70 | ,, | Carrick on Shannon | 2·36 |
| ,, | Whitby | ... | XXIII. | Rockcorry | 1·67 |
| X. | Gainford | ·61 | ,, | Warrenpoint | 1·16 |
| ,, | Unthank Hall | 1·94 | ,, | Newtownards | 1·10 |
| ,, | Shap | 2·16 | ,, | Bushmills | 2·38 |
| IX. | Llanfrechfa | 2·25 | ,, | Buncrana | 3·01 |

# THE LATE RAINFALL.

*To the Editor of the* TIMES.

SIR,—The accompanying table will show that only four times in 20 years has more than an inch and a-half of rain fallen at this station in 24 hours, and that during that period there is no instance of a fall of two inches in 24 hours.

These facts will render evident the extraordinary features of the rain of Wednesday night, when nearly 2½ inches fell in 12 hours, and not only so but the fall continued until 1.30 p.m. to-day, up to which time 3¼ inches had fallen.

It is somewhat too soon to speak positively as to the whole of the features of this remarkable and for this locality unprecedented fall, but a few of the leading features may be mentioned. First, it has been rather local; all the reports which I have received from the upper part of the watershed of the Thames, Oxford, Cirencester, Marlborough, &c., show that the fall there has been under an inch, and personal inspection of the Thames Valley this afternoon has shown few large volumes of water running in. The self-recording evaporator at Strathfield Turgiss shows that the fall of rain began about 3 p.m. yesterday and ended at 5 a.m. this day, but as already indicated the total amount is small, only 0·67 in.

I am glad to be able to supply a list of the fall at nine stations in or near the metropolis, which probably shows the facts as well as, or better than, any comments could do. It is curious that the fall here has been a trifle heavier than at any other station, but among the North London stations the agreement is remarkable, and I must add creditable to the observers. It appears that the fall on the south side of the Thames was less than in the north, but I have not yet received all the returns from that district.—I am, Sir, your obedient Servant,

G. J. SYMONS.

62. *Camden-square, N.W., April 11th.*

HEAVY FALLS AT CAMDEN SQUARE.

| | In. | | | In. | |
|---|---|---|---|---|---|
| 1858 | ·94 | May 24. | 1868 | ·93 | May 29. |
| 1859 | 1·66 | Sept. 26, 1·01 June 12. | 1869 | 1·03 | November 27. |
| 1860 | 1·10 | May 12. | 1870 | ·95 | March 3. |
| 1861 | 1·42 | November 13. | 1871 | 1·23 | July 10th, 1·22 Sept. 29. |
| 1862 | ·94 | August 16. | 1872 | 1·05 | October 21. |
| 1863 | 1·55 | June 18, 1·02 June 5. | 1873 | 1·04 | October 12. |
| 1864 | 1·01 | November 23. | 1874 | ·99 | September 30. |
| 1865 | 1·12 | Jan. 26, 1·05 Oct. 22, 1·01 August 23. | 1875 | 1·29 | July 14. |
| | | | 1876 | 1·61 | December 23. |
| 1866 | 1·33 | June 30, 1·20 Jan 10. | 1877 | ·88 | November 11. |
| 1867 | 1·82 | July 25. 1·03 May 20. | 1878 | 2·56 | April 11. |

DETAILS OF RAINFALL OVER THE LONDON DISTRICT, APRIL 10TH AND 11TH.

| | Rainfall from 9 a.m. on 10th, to 9 p.m. | Rainfall from 9 p.m. on 10th, to 9 a.m. on 11th. | Rainfall from 9 a.m. on 11th, to 3 p.m. | Rainfall from 9 p.m. on 10th, to 3 p.m. on 11th. | Total Rainfall from 9a.m. on 10th, to 3 p.m. on 11th. |
|---|---|---|---|---|---|
| | Inches. | Inches. | Inches. | Inches. | Inches. |
| London—Camden-sq. N.W. | ·082 | 2·475 | ·675 | 3·15 | 3·232 |
| ,, —Highgate | — | 2·65 | ·56 | — | 3·21 |
| ,, —235, Camden-rd., N. | — | *2·47 | ·70 | 3·17 | 3·17 |
| London—277, ditto | — | *2·54 | ·63 | 3·17 | 3·17 |
| ,, —Royal Botanic Gardens | ·09 | 2·06 | ·74 | 2·80 | 2·89 |
| Muswell Hill | — | 2·34 | ·43 | 2·77 | 2·77 |
| London—Hamilton-terrace, N.W. | — | *1·99 | ·74 | — | 2·73 |
| London—Springfield-road, N.W. | — | — | — | — | 2·69 |
| Croydon—Addiscombe | ·033 | 1·579 | ·588 | 2·167 | 2·200 |

* A small portion of this fell before 9 p.m. on the 10th.

## METEOROLOGY OF MARLBOROUGH.

THE example set by Mr. Smith, by presenting to our readers copies of his paper on the rainfall of Hull, has not been set in vain. We have the pleasure of issuing with the present number a very interesting and useful meteorological history of the year 1877 at Marlborough, and a table of the rainfall as observed in that town from 1864 to 1877, both inclusive. We are not sure whether we and our readers are indebted to the Marlborough College Natural History Society or to its President, the Rev. T. A. Preston, for these valuable tables, but the two are so inseparable that it does not much matter. Need we point also to the great advantage of boys being early enlisted in such pursuits as those of which these tables are but one branch. There were no School Natural History Societies in our school-boy days, it was all Ovid, Virgil, and Homer.

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## THE AMERICAN STORM WARNINGS.

*Continued from page* 28.

"In February, 1877, Mr. J. G. Bennett, the well-known proprietor of the *New York Herald*, commenced sending occasional warnings to Europe, which have been published in the newspapers.

"The Meteorological Office, on the first appearance of these warnings, opened communications with the London Office of the *New York Herald*, and received a most ready response. Since that date we have received, almost without intermission, a copy of each storm-warning telegram which has been transmitted to this country from New York.

"I have instituted a careful comparison between these warnings and the weather subsequently experienced in these islands, and the main facts of this comparison are enumerated in the following tables, the headings to which explain themselves.

"The general result of the comparison is that during the entire period of nearly eleven months, thirty-six telegrams were received conveying warnings of forty different disturbances. . . .

"Classifying these warnings under four categories, viz., A, absolute success; B, partial success; C, very slight success; D, absolute failure; we find—

| | | | | |
|---|---|---|---|---|
| A | ..... | 7 | ..... | 17·5 |
| B | ..... | 10 | ..... | 25·0 |
| C | ..... | 6 | ..... | 15·0 |
| D | ..... | 17 | ..... | 42·5 |
| | | 40 | | 100·0 |

"These figures, therefore, show that not 45 per cent. of the warnings can be considered to be really successful. What is meant by 'really successful' is that the information conveyed by them was of real value to seamen in British ports.

"In conclusion, I can only say that while meteorologists are most deeply indebted to the generous public spirit of the proprietors of the *New York Herald* for their great liberality in transmitting these warnings gratuitously, the statistics given in the foregoing pages indicate that the results [estimates?] of Mr. Daniel Draper are over sanguine, as regards the possibility of calculating the date of arrival of dangerous storms on our coasts, and that as yet the attempts to foretell weather by means of the Atlantic Cables have not met with a very marked measure of success.

"In the present state of our knowledge, we are of opinion that much more good would be done by publishing the facts on which the issue of the warning is from time to time based. It will be impossible to institute a thoroughly satisfactory testing of the warnings until we have before us a long series of synoptic charts of the winds and weather existing between America and Europe, similar to those now in process of publication for the month of August, 1873, by the Meteorological Office, samples of which may be seen in a paper by Captain Toynbee, on the Nova Scotia hurricane of the month in question, which appeared in the *Nautical Magazine* for December, 1877."

The paper concludes with a tabular analysis of the 36 warnings sent during 1877, which are so arranged that any reader can compare them with his own journal, and ascertain how far it corroborates the verdicts passed by Mr. Scott.

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## THE WEATHER IN MARCH.

There was a fall of the mercury over all Western Europe at the beginning of the month, the change varying from 0·3 in. in the N. of Scotland to about 0·02 in. at Paris. The highest readings (30·3 in.) lay in a narrow band over South France, the lowest (29·2 in.) were still shown to the northward of Scotland. This decrease continued all the next day over Scandinavia, N. Germany, and the southern parts of France, while over the British Islands the barometer had begun to rise. Temperature was very uniform over these Islands, and varied from 51° in London to 42° in the Hebrides. On the 3rd, pressure increased briskly in all parts of Western Europe, and the area of low readings which on the two days previous lay over the N. of Scandinavia, passed away over the Baltic. A large anti-cyclone lay over the Channel, the N.W. of France, and the Bay of Biscay. (L'Orient 30·51 in.) In the evening the barometer was still rising, except in the W., where it was steady, and the southerly wind rose to a strong breeze. On the 4th a depression lay near the Shetlands, and a second was approaching the W. coast of Scotland, while the area of high readings was still shown over the Channel and N.W. of France. The wind was easterly over the Bay of Biscay, south-westerly on all our coasts, and south-easterly at Skudesnäes; it reached the force of a gale at Valentia and Skudesnäes, but was moderate in most other places. Next day the barometer rose over England, Ireland, and the N.W. of France, but was decreasing everywhere else—rapidly over Norway and Sweden. This rise did not last through the day, and the next morning the barometer fell rapidly in the N., and to a less extent in all parts of Western Europe, except the S.W. of France and N. of Spain; a deep depression advanced to the neighbourhood of the Shetlands, suddenly, during the night, readings at its centre being about 29 in., while at Corunna the mercury was as high as 30·79 in.; very steep gradients were formed on our coasts. Wind was westerly over these Islands and France, but drew into S.W. on the eastern shores of the North Sea; it blew a fresh to a hard gale on our W., N. and N.E. coasts, and was strong and squally elsewhere. Temperature was high and very uniform, and the sky was clouded. The barometer began to rise the next day over the greater part of Ireland and England, but a fresh depression appeared in the N. of Scotland. This depression advanced south-eastwards, and had its centre at 8 a.m. over the Sound, where the barometer fell rapidly. Pressure again recovered over Scandinavia, and quickly on our E. coasts, and over the Netherlands, but in the W. the mercury fell briskly during the night, 8th–9th ult. A large area of high readings lay over France and threw out an arm northwards as far as Shields on the 9th, and in the evening it was reported that the barometer was falling briskly in the Hebrides, with a fresh south-westerly wind, while in all other parts of our Islands pressure was decreasing though more slowly. The 10th, 11th, 12th, and 13th partook largely of the character of their predecessors, though the con-

ditions were not so strongly marked. Readings were highest off our south-western coasts and over the Bay of Biscay, while depressions passed from N.W. to S.E. across Norway, Denmark, and Sweden, causing north-westerly winds strong to a gale on many parts of our coasts, with unsettled weather. By the 13th the last of these disturbances had disappeared over the Baltic, and pressure became high and uniform over these Islands, with light to moderate northerly breezes and fine weather, and from this time till the 24th a similar state of affairs prevailed.

Very little change occurred in the general distribution of pressure and winds until the 24th, when atmospheric pressure was increasing over Sweden and Norway, but decreasing over the whole of Western Europe, rather briskly in the north; readings were highest in the N. of Spain, but over these Islands and their immediate neighbourhood the distribution of pressure was very irregular; several small atmospherical disturbances being shewn. Wind was northerly to north-westerly, and though light or moderate in most places was strong and squally over Scotland and the Irish Sea. In the course of the day a small depression passed southward from the north of Scotland along our east coast, causing an extremely sudden change in the weather, bright, clear skies being followed very quickly by heavy snow, while the wind rose to a fresh or hard gale in the W. of Scotland and N.W. of England. In addition to this a very sudden and heavy north-westerly squall passed with great rapidity over England, the wind for a few minutes rising to the force of a fresh gale. This change occurred at 10.20 a.m. at Bedale, in Yorkshire, at 3.30 p.m. in London, and at about the same time in the Channel.

On the 25th the mercury fell somewhat over the Netherlands and East of France, but rose in all other places: a large area of low pressure, having two foci, one over the Skager Rack, the other near Brussels, lay over the North Sea, and the countries on its eastern shores. Snow and hail occurred over the greater part of this country. Later in the day the mercury began to rise, and continued to do so until the 27th, when a small depression appeared to have passed across Scotland during the night, and joined that which was lying over the Skager Rack on the 26th. The weather was unsettled, with snow showers in many parts of the country. In the evening the depression noticed above travelled eastwards, over the S. of Sweden, and a slight recovery commenced on our east coast, though elsewhere the barometer still fell. This decrease spread the next day over the whole of Western Europe, and two distinct areas of low readings were shown, one still in the neighbourhood of the Skager Rack (the Skaw 29·32 in.), the other over the Bay of Biscay (L'Orient 29·45 in.) Readings were very uniform, and the winds, which were light, were governed by the two cyclonic systems. During the day (28th) the southern disturbance became much deeper, and advancing slowly up the Channel, caused strong easterly winds in the S.E. and S. at 6 p.m. After that hour the wind rose quickly, and an exceptionally heavy easterly gale was felt all along our S. coast. Such a strong gale from the eastward has not been experienced in the Channel for a long time, and the snow which accompanied it was exceedingly heavy, more particularly in Devon and Cornwall.

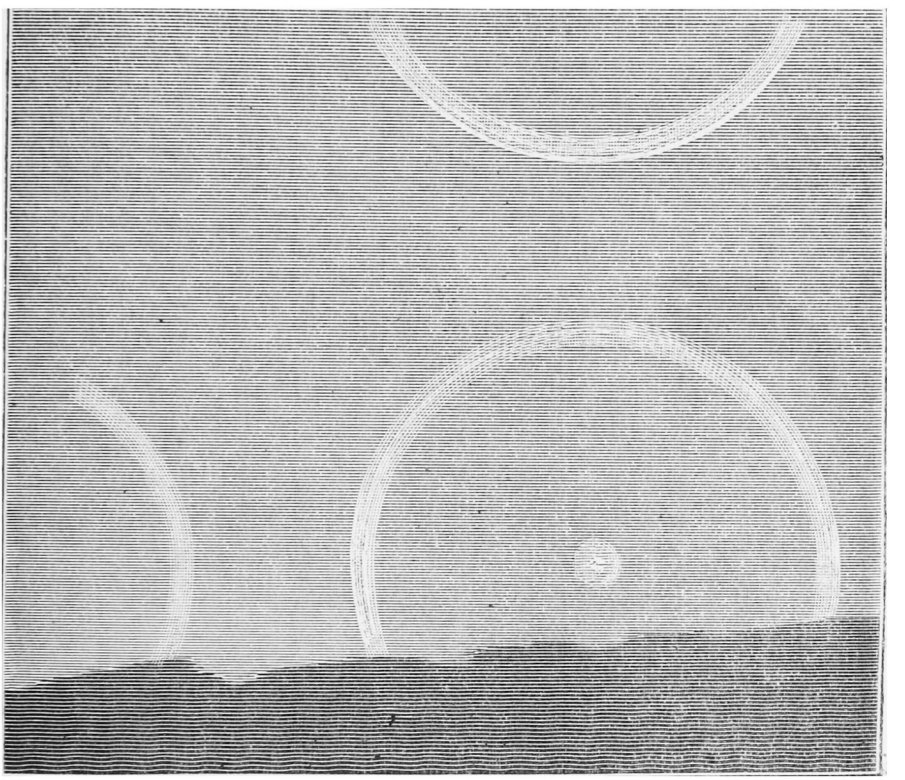
Reports the next morning shewed that the bar. was rising in the N., while the northern depression was filling up, and had become of very little importance, the southern disturbance, on the contrary, which at this time lay over the Channel and N.W. of France, had become very much deeper (Brest, 28·92 in.), and caused steep gradients over England and Ireland. It was reported later in the day that the depression was moving away eastwards over N. Germany, while the wind had backed to the northward. At Shields it blew a hard gale at 7 p.m.

On the 30th the mercury fell quickly on the eastern shores of the North Sea, and the disturbance lay apparently over N. Germany and the Netherlands, but a brisk recovery began over the N.W. of France and the S.W. of England, but elsewhere very little change was reported. Wind was N.E. to E., except in Sweden. Temperature was rather higher in the W., but was lower elsewhere, several degrees over France; it varied from 39° to 31° over these Islands. The weather was unsettled with snow showers in several places, and the day passed without any change. H. E. M.

## SOLAR HALOS AND PARHELIA.

*To the Editor of the Meteorological Magazine.*

SIR,—This afternoon my sister had the good fortune to see a most interesting and beautiful solar halo—or, rather, system of halos—and parhelia. The phenomenon was first noticed about a quarter-past 4, and continued to get brighter till 4.20, and then gradually faded away, lasting altogether about 20 minutes. The accompanying sketch



will give some idea of the appearance it presented. The sky was tolerably clear at the zenith, but very hazy towards the horizon, where there was a thick bank of clouds; the halo round the sun, and the portion on the East, were merely hazy whiteness, with bright spots just tinged with pink and yellow where the parhelia would appear, but the upper inverted arc had all the prismatic colours (the purple being uppermost, or inside the arc), and appeared quite as bright as, if not brighter than, an ordinary rainbow.

This short account will perhaps be interesting for comparison with any other notes you may have on the occurrence.

I am, Sir, yours obediently,

E. WHITE WALLIS.

1, *Springfield Road, St. John's Wood, March* 14*th*, 1878.

# MARCH, 1878.

| Div. | | STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.] | RAINFALL. Total Fall. | Difference from average 1860–5 | Greatest Fall in 24 hours. Dpth | Date. | Days on which ·01 or more fell. | TEMPERATURE. Max. Deg. | Date. | Min. Deg. | Date. | No. of Nights below 32° In shade | On grass. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | inches | inches. | in. | | | | | | | | |
| I. | ENGLAND. | Camden Town | 1·12 | — ·96 | ·50 | 28 | 10 | 58·0 | 3 | 26·4 | 17† | 10 | 15 |
| II. | | Maidstone (Hunton Court) | 2·01 | — ·15 | ·76 | 28 | 12 | ... | ... | ... | ... | ... | ... |
| ,, | | Selborne (The Wakes) | 1·35 | — 1·25 | ·69 | 28 | 6 | 54·5 | 21 | 21·0 | 17 | 10 | 14 |
| III. | | Hitchen | 1·20 | — ·97 | ·41 | 31 | 10 | 57·0 | 1 | 23·0 | 31 | 16 | ... |
| ,, | | Banbury | ·67 | — 1·53 | ·18 | 31 | 12 | 57·0 | 1 | 24·0 | 23 | 13 | ... |
| IV. | | Bury St. Edmunds (Culford) | 1·10 | — 1·10 | ·28 | 29 | 12 | 59·0 | 1 | 15·0 | 31 | 16 | 16 |
| ,, | | Norwich (Sprowston) | 1·17 | ... | ·18 | 31 | 19 | ... | ... | ... | ... | ... | ... |
| V. | | Bridport | 2·09 | — ·76 | ·49 | 28 | 11 | ... | ... | ... | ... | ... | ... |
| ,, | | Barnstaple | 1·51 | — 1·64 | ·37 | 9 | 11 | 58·0 | 4 | 29·0 | 27 | ... | ... |
| ,, | | Bodmin | 2·72 | — 1·03 | ·52 | 29 | 16 | 57·0 | 9 | 23·0 | 17 | 3 | 9 |
| VI. | | Cirencester | 1·64 | — ·96 | ·65 | 1 | 9 | ... | ... | ... | ... | ... | ... |
| ,, | | Shifnal (Haughton Hall) | 1·12 | — ·82 | ·24 | 28 | 13 | 56·0 | 1 | 24·0 | 23‡ | 11 | 12 |
| ,, | | Tenbury (Orleton) | 1·13 | — 1·29 | ·38 | 28 | 14 | 59·0 | 1 | 25·5 | 23 | 12 | 14 |
| VII. | | Leicester (Town Museum) | ·69 | ... | ·23 | 27 | 13 | 54·7 | 1 | 26·0 | 23 | 8 | 19 |
| ,, | | Boston | ·80 | — ·99 | ·40 | 24 | 8 | 58·0 | 1 | 25·0 | 23‖ | 11 | .. |
| ,, | | Grimsby (Killingholme) | ·92 | ... | ·29 | 24 | 11 | 57·0 | 6 | 28·0 | 23‖ | 9 | ... |
| ,, | | Mansfield | ·49 | ... | ·13 | 26 | 12 | 58·2 | 10 | 25·0 | 25 | 10 | 18 |
| VIII. | | Manchester (Ardwick) | ·88 | — 1·56 | ·33 | 13 | 9 | 58·0 | 17 | 26·0 | 1 | 10 | ... |
| IX. | | York | ·96 | — 1·03 | ·23 | 1,8 | 8 | 57·0 | 1*a* | 23·0 | 25 | 12 | ... |
| ,, | | Skipton (Arncliffe) | 3·85 | — ·96 | 1·52 | 1 | 14 | ... | ... | ... | .. | ... | ... |
| X. | | North Shields | 1·17 | — 1·18 | ·36 | 29 | 11 | 57·0 | 1,18 | 26·4 | 23 | 12 | 12 |
| ,, | | Borrowdale (Seathwaite) | 8·06 | — 5·34 | 1·47 | 5 | 12 | ... | ... | ... | ... | .. | ... |
| XI. | WALES. | Cardiff (Crockherbtown) | 1·25 | ... | ·40 | 28 | 8 | ... | ... | ... | ... | 13 | ... |
| ,, | | Haverfordwest | 1·74 | — 1·71 | ·37 | 28 | 15 | 58·0 | 2 | 27·0 | 13§ | 8 | 14 |
| ,, | | Aberdovey | 1·28 | ... | ·20 | 1,17 | 15 | 62·0 | 21 | 28·0 | 23 | 7 | ... |
| ,, | | Llandudno | 1·85 | — ·41 | ·59 | 1 | 15 | 55·2 | 21 | 31·4 | 14 | 2 | ... |
| XII. | | Dumfries (Crichton Asylum) | 1·07 | — 1·53 | ·24 | 4,9 | 8 | 55·3 | 19 | 24·0 | 23 | 17 | 18 |
| ,, | | Hawick (Silverbut Hall) | ·82 | ... | ·17 | 4 | 9 | ... | ... | .. | ... | ... | ... |
| XIV. | | Glasgow (Cessnock Park) | 2·82 | — ·62 | ... | .. | ... | ... | ... | ... | ... | ... | ... |
| XVI. | | Mull (Quinish) | 2·90 | .. | ·68 | 4 | 16 | ... | ... | ... | ... | ... | ... |
| ,, | | Loch Leven | 1·00 | — 1·82 | ·30 | 6 | 5 | ... | ... | ... | ... | ... | .. |
| ,, | | Tyndrum (Ewick) | ... | ... | ... | ... | ... | .. | ... | ... | ... | ... | ... |
| ,, | | Arbroath | ·80 | — 1·24 | ·38 | 26 | 6 | 60·0 | 18 | 26·0 | 24¶ | 13 | ... |
| XVII. | | Braemar | 1·85 | — ·36 | ·51 | 26 | 13 | 51·8 | 19 | 5·0 | 29 | 18 | 24 |
| ,, | | Aberdeen | 2·19 | ... | ·34 | 26 | 17 | 56·1 | 18 | 23·9 | 28 | 12 | 21 |
| XVIII | | Gairloch | 3·31 | ... | ·41 | 4 | 20 | ... | ... | ... | ... | .. | ... |
| ,, | | Portree | 5·91 | — 3·13 | ·85 | 3 | 27 | ... | ... | ... | ... | ... | ... |
| ,, | | Inverness (Culloden) | 1·39 | — ·57 | ·47 | 31 | 19 | 55·0 | 20 | 22·9 | 29 | 12 | 17 |
| XIX. | | Dunrobin | 3·34 | + ·72 | ·62 | 5 | 21 | 55·5 | 20 | 23·0 | 31 | 16 | ... |
| ,, | | Sandwick | 4·03 | + ·70 | ·51 | 5 | 24 | 50·9 | 4 | 25·3 | 24 | 11 | 17 |
| XX. | IRELAND. | Caherciveen DarrynaneAbbey | 1·83 | ... | ·22 | 4,24 | 19 | ... | ... | ... | ... | ... | ... |
| ,, | | Cork | 1·27 | ... | ·50 | 1 | 8 | ... | ... | ... | ... | ... | ... |
| ,, | | Waterford | 1·11 | — 1·78 | ·65 | 2 | 9 | 57·0 | 18 | 30·0 | 15 * | 7 | ... |
| ,, | | Killaloe | 1·98 | — 2·34 | ·55 | 5 | 15 | 64·0 | 21 | 28·0 | 15†† | 12 | ... |
| XXI. | | Portarlington | 1·45 | — 1·86 | ·33 | 23 | 27 | 57·0 | 2 | 28·0 | 15 | 11 | ... |
| ,, | | Monkstown, Dublin | 1·22 | — 1·36 | ·25 | 28 | 13 | 66·0 | 22 | 26·0 | 14‡‡ | 10 | ... |
| XXII. | | Galway | 2·50 | ... | ·89 | 2 | 19 | 60·0 | 19 | 30·0 | 16§§ | 6 | ... |
| XXIII | | Waringstown | 1·88 | ... | ·32 | 4 | 18 | 56·0 | 1 | 27·0 | 25 | 13 | 16 |
| ,, | | Edenfel (Omagh) | 1·64 | ... | ·36 | 4 | 19 | 52·0 | 18* | 27·0 | 13‖‖ | 14 | ... |
| ,, | | Ballyshannon | 1·80 | ... | ·50 | 4 | 15 | ... | .. | ... | .. | ... | ... |

* And 21. † And 26. ‡ And 24. ‖ And 24, 25, 26. § And 14. ¶ And 28, 29.
** And 23, 26. †† And 16, 23. ‡‡ And 15. §§ And 17. ‖‖ And 27. *a* And 19, 23.
\+ Shows that the fall was above the average; — that it was below it.

# METEOROLOGICAL NOTES ON MARCH.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; T S for Thunderstorm; R for Rain; H for Hail; S for Snow.

## ENGLAND.

HITCHEN.—A good deal of S towards the end of the month.

BANBURY.—High wind on the 1st and 6th; S almost every day from the 24th to the end of the month.

CULFORD.—This month has quite reversed the adage about "March coming in like a lion and going out like a lamb" the early part being distinguished by remarkably mild weather, while the latter part, and more particularly the last week, was of the most winterly character. It is rather remarkable that the max. temp. should have occurred on the first and the min. on the last day, the ther. falling to 15°, and in some parts of the neighbourhood I hear of greater cold being experienced. It is feared that the fruit crops are entirely destroyed. Mean temp. about the average (41°·2). High wind on 6th, 7th and 24th; H on 14th and 25th, and S almost every day from the 22nd.

HAUGHTON HALL.—March came in like a lamb, the 1st being the warmest day of the month (56°), with high bar. and S.W. wind. This pleasant, but deceitful, weather lasted till the 6th, when a strong gale set in from W., which lasted three days; from that time temp. gradually fell till night of 13th, when frost set in, continuing nightly with three exceptions (19th, 20th and 21st) till the close. S or sleet from 21st to 24th, which lay under the hedges till joined by more on 28th and 31st, causing April to come in clad in S with hard frost (25°). Apricot blossom all destroyed, and other damage done in garden.

ORLETON.—The first three weeks were dry with an average amount of sunshine, and warm with the exception of the period between the 13th and 17th, when there were frosts each morning. From the 22nd to the end of the month the weather was cold, with severe frosts and S showers almost every day. On 28th S fell nearly all day, and in the evening drifted much with a strong N.E. wind, blocking up many of the roads on the hills, and covering the whole country to a depth of 5 in. Bar. generally high; mean temp. about 1°·5 higher than the average; R less than half the average.

LEICESTER.—Lunar halo on 10th. S almost daily from 22nd to 27th.

BOSTON.—Beginning of the month mild, fine and open; the mean temp. of the month being 1° above the average. On the 23rd a cold period set in, the temp. for four nights in succession falling to 25°. Monday, the 29th, was one of the most bitterly cold days one may ever wish to encounter. A somewhat similar cold period with a snowstorm occurred in March, 1876, and also in April of the same year. Wind principally from N.W., blowing from that quarter for 20 days, or more than double the average.

GRIMSBY.—Up to the 22nd the weather was prematurely mild, afterwards it was proportionately severe. It has been a good seed-time for spring corn, and March dust has been abundant. The rainfall of the last three months only amounts to 4·03 in. Peach in blossom, and frogs spawning on 2nd, rooks building on 4th.

MANSFIELD.—2nd, 3rd, and 4th beautiful spring days; 5th to 8th high wind. Cold winds with frequent S showers from 22nd to end of month, but bright at intervals.

ARNCLIFFE.—High wind on 5th and 6th; S on 24th, 30th, and 31st.

NORTH SHIELDS.—A good deal of S towards the end of the month.

## WALES.

HAVERFORDWEST.—The general character of the month was mild, unattended by much wind, and very little R; with remarkably high pressure which began to give way on the 20th, when a bleak wintry period set in, with frost and S; prevailing winds N.W. to N. and N.E.

ABERDOVEY.—Generally cloudy, but comparatively dry. S and frost towards the end of the month; prevailing wind, N. to N.E.; from the 7th to the close, great and sudden variations in temp.

LLANDUDNO.—March went out like a lion, the last four days being both snowy and windy, but on the whole it was an unusually fine month; mean temp. more than 3° above the average.

## SCOTLAND.

DUMFRIES.—Rainfall very small, and weather generally cold and stormy. S fell frequently in the latter half of the month, and during the same time frost was almost continuous in the morning and evening; the mean temp. is, however, quite as high as the average.

SILVERBUT HALL.—Strong westerly gales during the first week, middle of the month lamb-like, last week snowy, frosty, and very lion-like. Beautiful lunar halos on the nights of the 13th and 14th. A brilliant meteor at a little past 10 in the forenoon of the 26th, passed across the heavens from S. to N. at no great height; at the time the sky was clear and cloudless, and the sun was shining brightly.

QUINISH.—Mild genial weather until the 21st, when cold N. and N.E. winds, with S showers and frost at night, set in, and lasted till the 31st.

ARBROATH.—Last ten days of the month very cold and stormy.

BRAEMAR.—An excellent dry month up to the 21st, afterwards a heavy fall of S with intense frost. Oats sown on 15th, an unusual early date for this locality.

ABERDEEN.—A month of fine mild weather up to the 21st.. From that time to the end of the month a severe snowstorm, S melting from day to day in town, but in the country lying in some places in very deep drifts.

PORTREE.—An unprecedented stormy month; 4th to 8th S.W. gales, and from N.E. on 29th. S from 21st to end of month, with severe frost and piercing cold wind. More S than has ever been known before at this season. Vegetation, and all other out-door labour completely stopped. The spring will now be late here.

DUNROBIN.—Up to the 20th, the weather was mostly fine and seasonable; from the 20th to the end, sharp frosts and heavy snowfalls prevailed.

SANDWICK.—February and March seem to have changed positions, February being unprecedentedly mild and March exceedingly cold, while the rainfall was much above the average. The first 11 or 12 days were wet, and sometimes stormy; then there was pleasant weather till the 21st, when S showers began and continued till the end of the month, with severe drift on the nights of 29th and 30th, which is unusual at this season.

## IRELAND.

DARRYNANE ABBEY.—Mountains white with S on morning of 25th; slight S showers on 29th.

KILLALOE.—Mild open weather up to the 14th, with high temp. and good vegetation, followed by sharp frosts to end of month. S on 24th, succeeded by heavy gales from N. and N.W., with bright cold weather to end of month. A very favourable month for spring agricultural work.

MONKSTOWN.—The early part of the month was mild and showery; sharp frosts on the mornings of 14th and 15th; 21st exceedingly fine and warm; from that date to the end bitterly cold with strong N. winds, accompanied by S and H. A strong N.N.E. gale on 29th.

WARINGSTOWN.—Cold, but dry and favourable for sowing.

EDENFEL.—For the first three weeks there was a continuance of the fine and spring-like weather of February, but in the last 10 days there followed the only wintry weather we have had, with more or less daily S, and nightly frost, exactly reversing the proverbial character of March.

BALLYSHANNON.—The month was a very favourable one for spring work; the ground has been well dried, and the crops have therefore been got well in; the temp. has been low, and vegetation slight, the prevailing winds being polar. Slight falls of S and H from 21st to 24th, with a little frost on 28th.